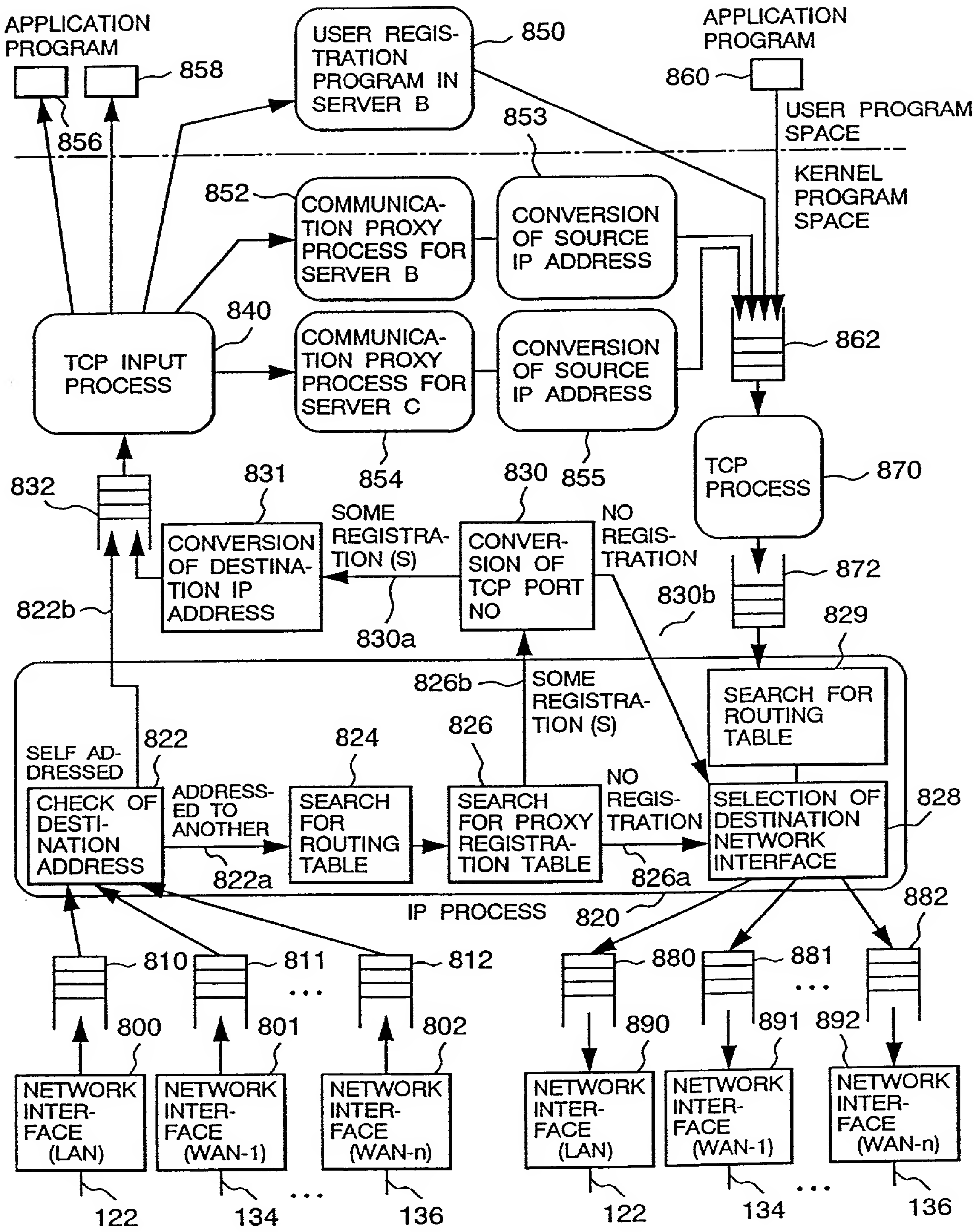
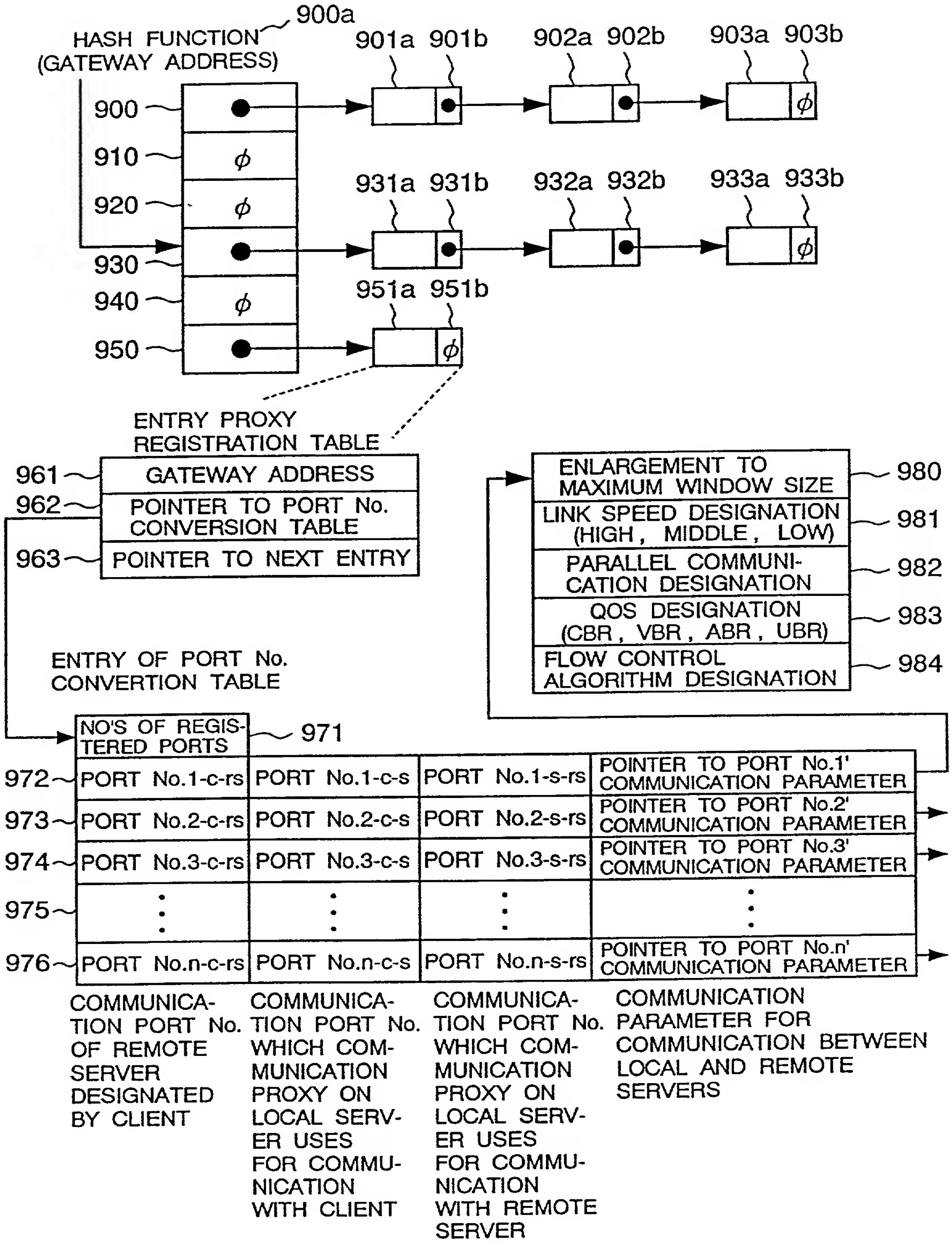
FIG. 1



10051050.012202

FIG. 2


HASH FUNCTION (GATEWAY ADDRESS)
900a
901a 901b
902a 902b
903a 903b
900
910
920
930
940
950
φ
931a 931b
932a 932b
933a 933b
951a 951b
ENTRY PROXY REGISTRATION TABLE
961
GATEWAY ADDRESS
962
POINTER TO PORT No. CONVERSION TABLE
963
POINTER TO NEXT ENTRY
ENLARGEMENT TO MAXIMUM WINDOW SIZE
980
LINK SPEED DESIGNATION (HIGH, MIDDLE, LOW)
981
PARALLEL COMMUNI-CATION DESIGNATION
982
QOS DESIGNATION (CBR, VBR, ABR, UBR)
983
FLOW CONTROL ALGORITHM DESIGNATION
984
ENTRY OF PORT No. CONVERTION TABLE
971
972
973
974
975
976

NO'S OF REGIS-TERED PORTS			
PORT No.1-c-rs	PORT No.1-c-s	PORT No.1-s-rs	POINTER TO PORT No.1' COMMUNICATION PARAMETER
PORT No.2-c-rs	PORT No.2-c-s	PORT No.2-s-rs	POINTER TO PORT No.2' COMMUNICATION PARAMETER
PORT No.3-c-rs	PORT No.3-c-s	PORT No.3-s-rs	POINTER TO PORT No.3' COMMUNICATION PARAMETER
⋮	⋮	⋮	⋮
PORT No.n-c-rs	PORT No.n-c-s	PORT No.n-s-rs	POINTER TO PORT No.n' COMMUNICATION PARAMETER
COMMUNICATION PORT No. OF REMOTE SERVER DESIGNATED BY CLIENT	COMMUNICATION PORT No. WHICH COMMUNICATION PROXY ON LOCAL SERVER USES FOR COMMUNICATION WITH CLIENT	COMMUNICATION PORT No. WHICH COMMUNICATION PROXY ON LOCAL SERVER USES FOR COMMUNICATION WITH REMOTE SERVER	COMMUNICATION PARAMETER FOR COMMUNICATION BETWEEN LOCAL AND REMOTE SERVERS

FIG. 3

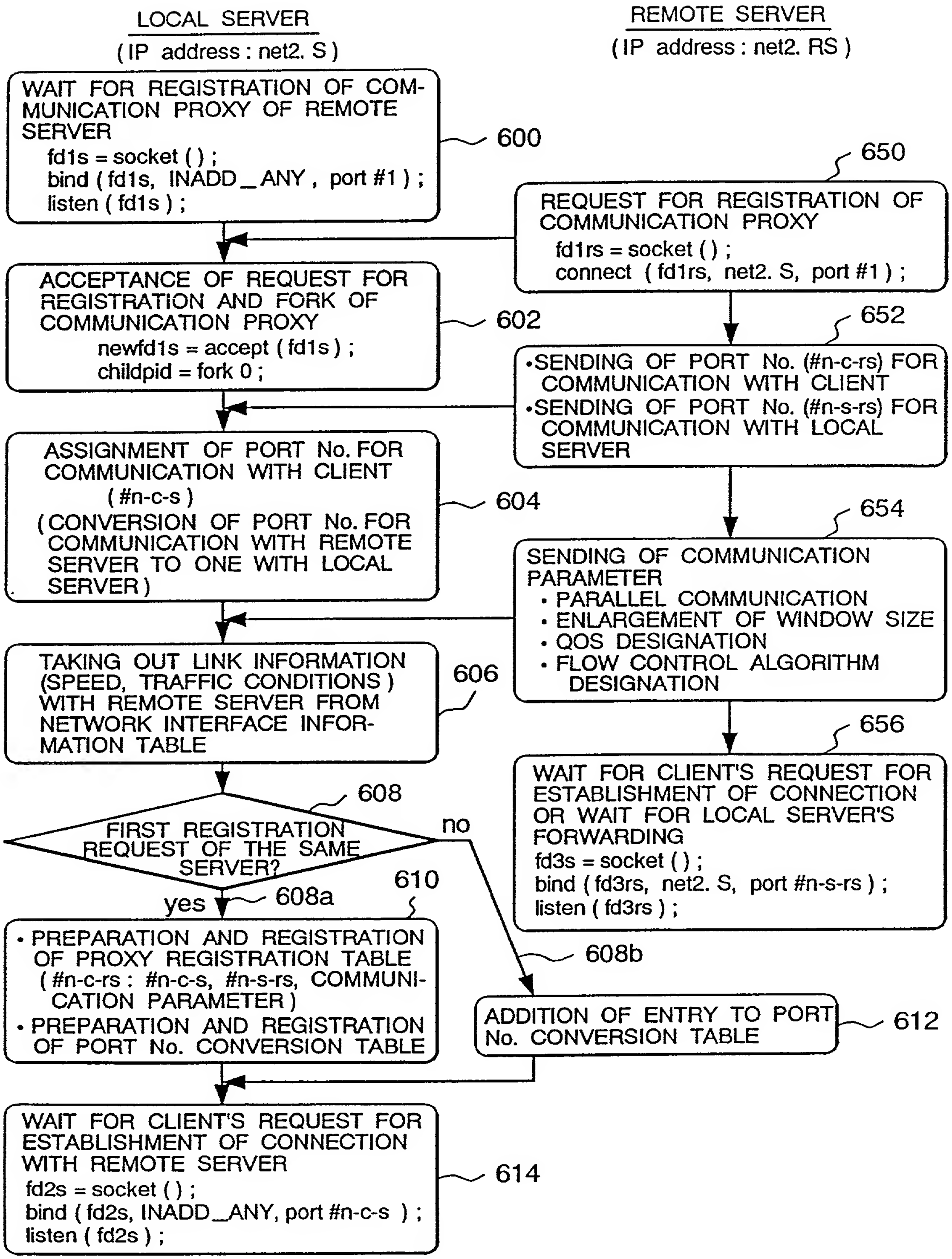

LOCAL SERVER
(IP address : net2. S)
REMOTE SERVER
(IP address : net2. RS)
WAIT FOR REGISTRATION OF COMMUNICATION PROXY OF REMOTE SERVER
fd1s = socket ( ) ;
bind (fd1s, INADD_ANY , port #1) ;
listen (fd1s) ;
600
650
REQUEST FOR REGISTRATION OF COMMUNICATION PROXY
fd1rs = socket ( ) ;
connect (fd1rs, net2. S, port #1) ;
ACCEPTANCE OF REQUEST FOR REGISTRATION AND FORK OF COMMUNICATION PROXY
newfd1s = accept (fd1s) ;
childpid = fork 0 ;
602
652
•SENDING OF PORT No. (#n-c-rs) FOR COMMUNICATION WITH CLIENT
•SENDING OF PORT No. (#n-s-rs) FOR COMMUNICATION WITH LOCAL SERVER
ASSIGNMENT OF PORT No. FOR COMMUNICATION WITH CLIENT (#n-c-s)
(CONVERSION OF PORT No. FOR COMMUNICATION WITH REMOTE SERVER TO ONE WITH LOCAL SERVER)
604
654
SENDING OF COMMUNICATION PARAMETER
• PARALLEL COMMUNICATION
• ENLARGEMENT OF WINDOW SIZE
• QOS DESIGNATION
• FLOW CONTROL ALGORITHM DESIGNATION
TAKING OUT LINK INFORMATION (SPEED, TRAFFIC CONDITIONS) WITH REMOTE SERVER FROM NETWORK INTERFACE INFORMATION TABLE
606
656
WAIT FOR CLIENT'S REQUEST FOR ESTABLISHMENT OF CONNECTION OR WAIT FOR LOCAL SERVER'S FORWARDING
fd3s = socket ( ) ;
bind (fd3rs, net2. S, port #n-s-rs) ;
listen (fd3rs) ;
608
FIRST REGISTRATION REQUEST OF THE SAME SERVER?
no
yes
608a
610
• PREPARATION AND REGISTRATION OF PROXY REGISTRATION TABLE (#n-c-rs : #n-c-s, #n-s-rs, COMMUNICATION PARAMETER)
• PREPARATION AND REGISTRATION OF PORT No. CONVERSION TABLE
608b
ADDITION OF ENTRY TO PORT No. CONVERSION TABLE
612
WAIT FOR CLIENT'S REQUEST FOR ESTABLISHMENT OF CONNECTION WITH REMOTE SERVER
fd2s = socket ( ) ;
bind (fd2s, INADD_ANY, port #n-c-s) ;
listen (fd2s) ;
614

FIG. 4

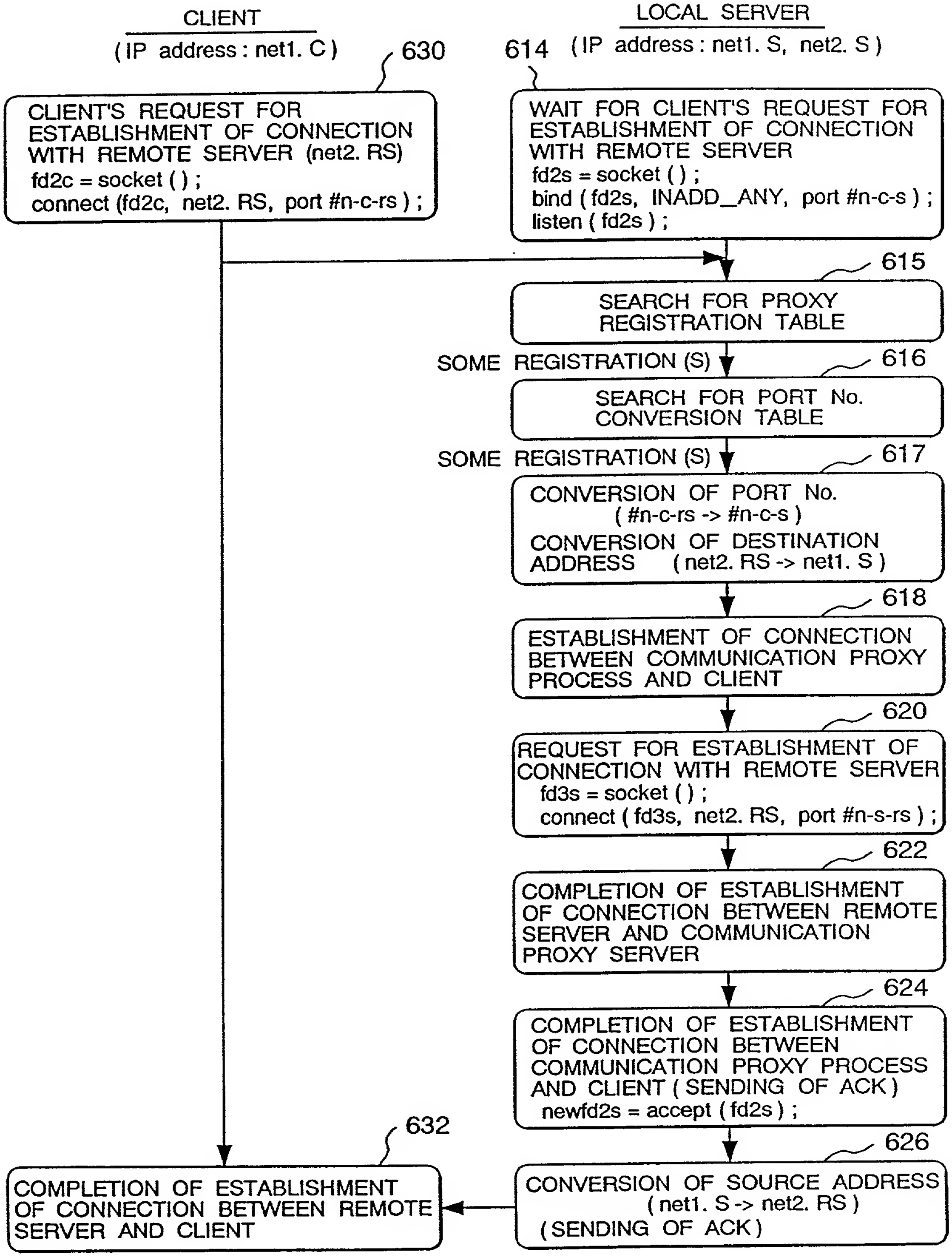

CLIENT
(IP address : net1. C)
630
614
LOCAL SERVER
(IP address : net1. S, net2. S)
CLIENT'S REQUEST FOR ESTABLISHMENT OF CONNECTION WITH REMOTE SERVER (net2. RS)
fd2c = socket ( ) ;
connect (fd2c, net2. RS, port #n-c-rs) ;
WAIT FOR CLIENT'S REQUEST FOR ESTABLISHMENT OF CONNECTION WITH REMOTE SERVER
fd2s = socket ( ) ;
bind (fd2s, INADD_ANY, port #n-c-s) ;
listen (fd2s) ;
615
SEARCH FOR PROXY REGISTRATION TABLE
SOME REGISTRATION (S)
616
SEARCH FOR PORT No. CONVERSION TABLE
SOME REGISTRATION (S)
617
CONVERSION OF PORT No. (#n-c-rs -> #n-c-s)
CONVERSION OF DESTINATION ADDRESS (net2. RS -> net1. S)
618
ESTABLISHMENT OF CONNECTION BETWEEN COMMUNICATION PROXY PROCESS AND CLIENT
620
REQUEST FOR ESTABLISHMENT OF CONNECTION WITH REMOTE SERVER
fd3s = socket ( ) ;
connect (fd3s, net2. RS, port #n-s-rs) ;
622
COMPLETION OF ESTABLISHMENT OF CONNECTION BETWEEN REMOTE SERVER AND COMMUNICATION PROXY SERVER
624
COMPLETION OF ESTABLISHMENT OF CONNECTION BETWEEN COMMUNICATION PROXY PROCESS AND CLIENT (SENDING OF ACK)
newfd2s = accept (fd2s) ;
632
626
COMPLETION OF ESTABLISHMENT OF CONNECTION BETWEEN REMOTE SERVER AND CLIENT
CONVERSION OF SOURCE ADDRESS (net1. S -> net2. RS)
(SENDING OF ACK)

FIG. 5a

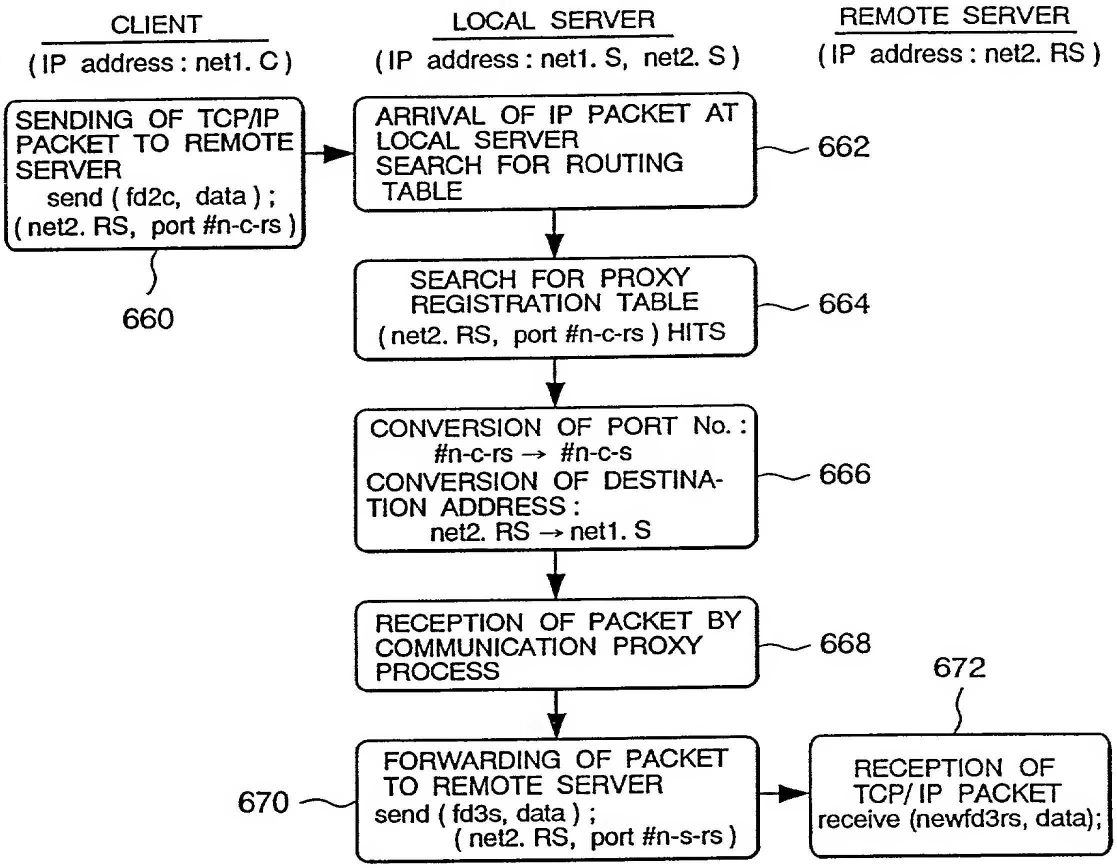
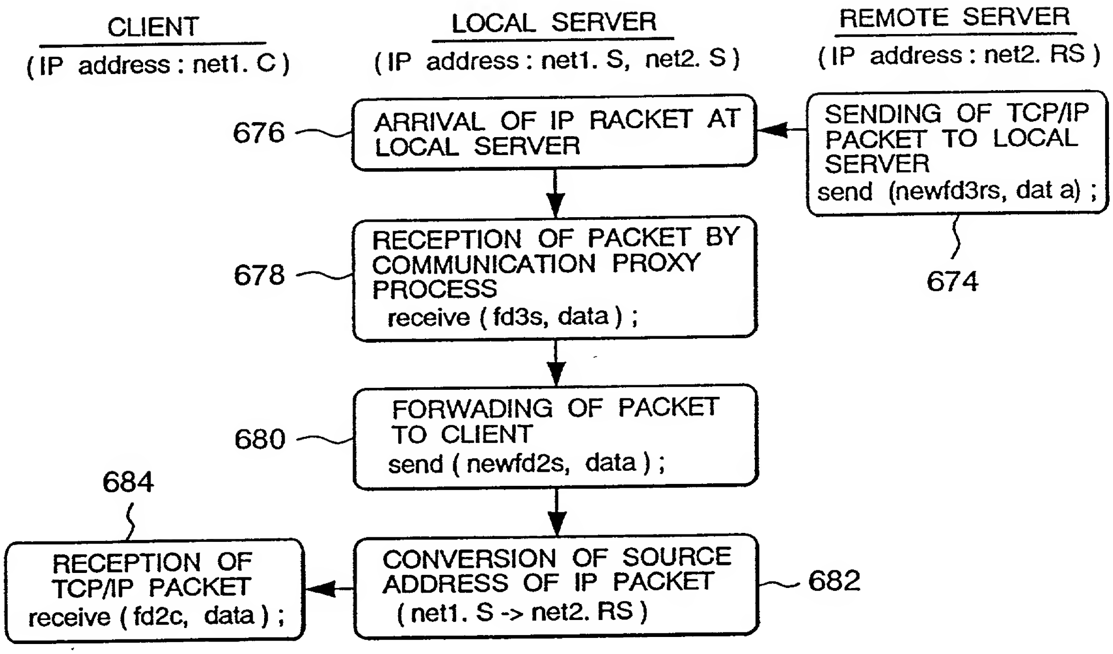

CLIENT
(IP address : net1. C)
LOCAL SERVER
(IP address : net1. S, net2. S)
REMOTE SERVER
(IP address : net2. RS)
SENDING OF TCP/IP PACKET TO REMOTE SERVER
send (fd2c, data) ;
(net2. RS, port #n-c-rs)
660
ARRIVAL OF IP PACKET AT LOCAL SERVER
SEARCH FOR ROUTING TABLE
662
SEARCH FOR PROXY REGISTRATION TABLE
(net2. RS, port #n-c-rs) HITS
664
CONVERSION OF PORT No. :
#n-c-rs → #n-c-s
CONVERSION OF DESTINATION ADDRESS :
net2. RS → net1. S
666
RECEPTION OF PACKET BY COMMUNICATION PROXY PROCESS
668
672
670
FORWARDING OF PACKET TO REMOTE SERVER
send (fd3s, data) ;
(net2. RS, port #n-s-rs)
RECEPTION OF TCP/ IP PACKET
receive (newfd3rs, data);

FIG. 5b


CLIENT
(IP address : net1. C)
LOCAL SERVER
(IP address : net1. S, net2. S)
REMOTE SERVER
(IP address : net2. RS)
SENDING OF TCP/IP PACKET TO LOCAL SERVER send (newfd3rs, dat a) ;
674
676
ARRIVAL OF IP RACKET AT LOCAL SERVER
678
RECEPTION OF PACKET BY COMMUNICATION PROXY PROCESS receive (fd3s, data) ;
680
FORWADING OF PACKET TO CLIENT send (newfd2s, data) ;
682
CONVERSION OF SOURCE ADDRESS OF IP PACKET (net1. S -> net2. RS)
684
RECEPTION OF TCP/IP PACKET receive (fd2c, data) ;

PRIOR ART

FIG. 6a

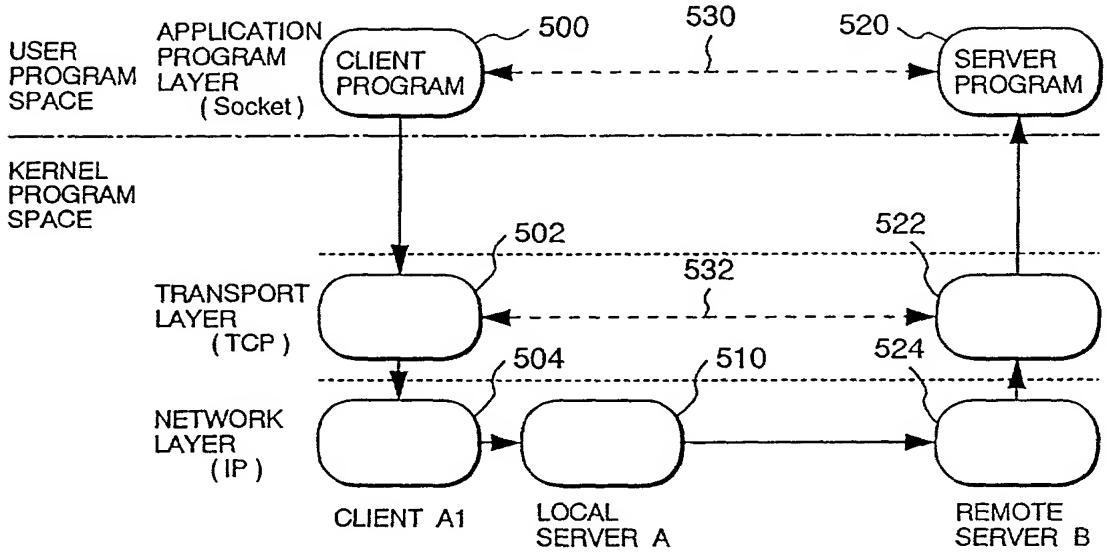


FIG. 6b

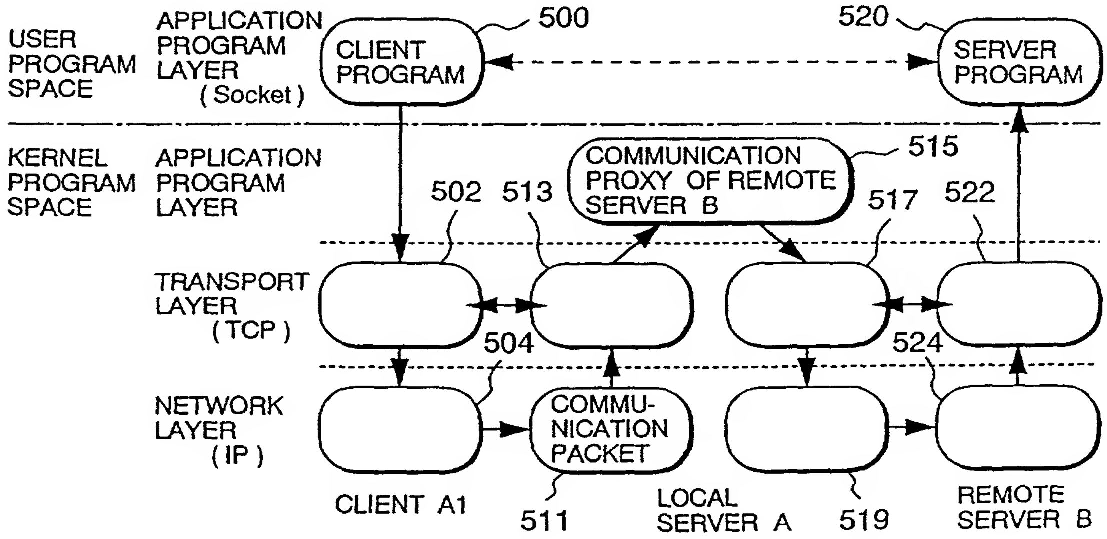


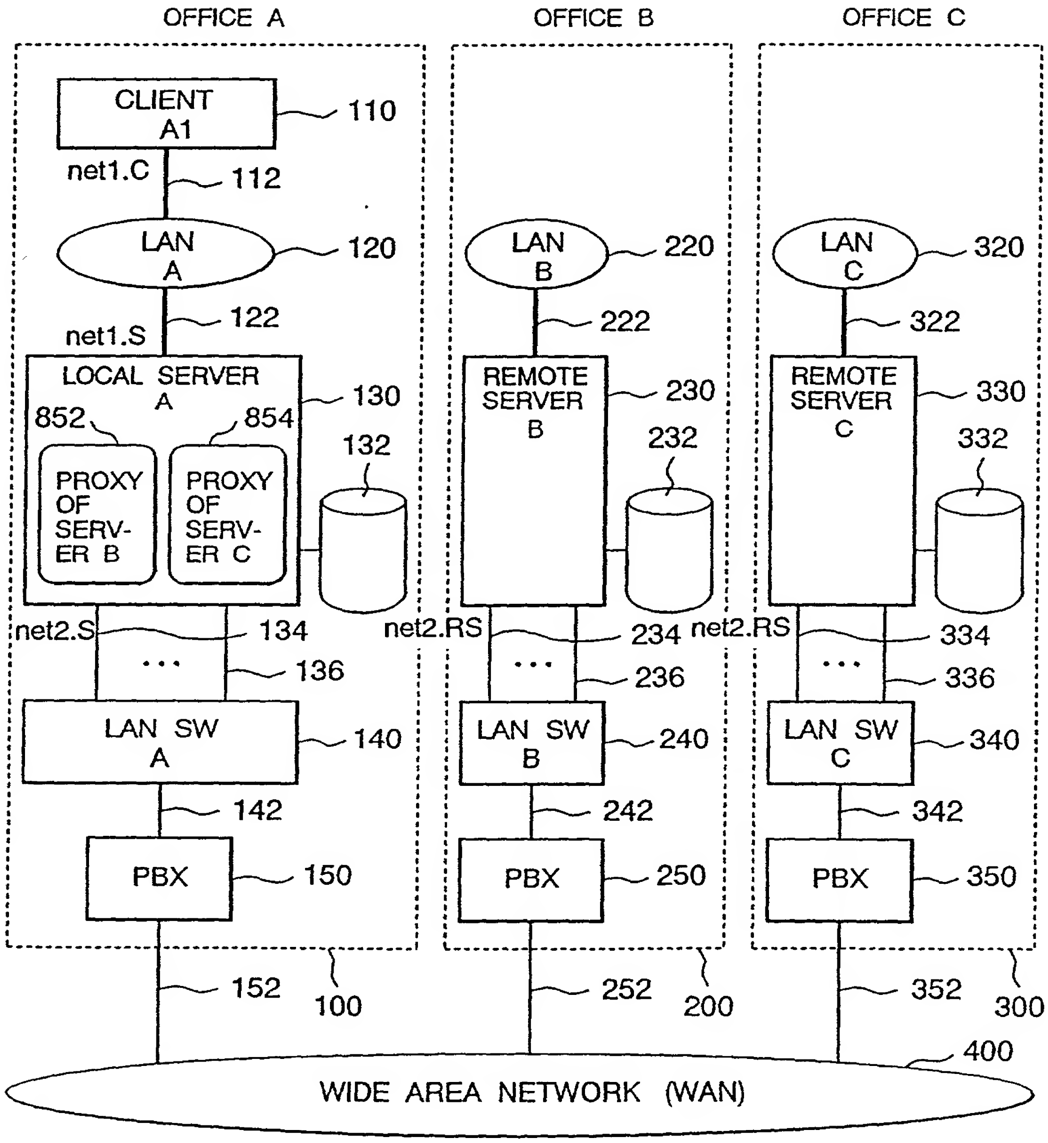
FIG. 7a

```
# define   SERV_TCP_PORT    6001          701
fd = socket (AF_INET,  SOCK_STREAM,  0) ;          702
serv_addr . sin_family = AF_INET ;          703
serv_addr . sin_addr. s_addr = htonl (INADDR  ANY) ;          704
serv_addr . sin_port = htons (SERV_TCP_PORT) ;          705
bind (fd , (struct  sockaddr  *) & serv_addr ,          706
     sizeof  (serv_ addr) ) ;
listen  (fd ,  5) ;          707
for  (  ;   ;  )  {
     newfd  =  accept (fd ,  (struct  aockaddr  *)          708
                    &cli_addr ,  &clilen) ;          709
     childpid  =  fork ( ) ;          710
     if (childpid  ==  0)  {          711
         close (fd) ;          /*  child  process  */          712
         send  and  receive  data  to  and  from  CLIENT ;          713
         exit (0) ;          714
     }
     close (newfd) ;          /*  parent  process  */          715
```

FIG. 7b

```
# define   SERV_TCP_PORT    6001          750
# define   SERV_HOST_ADDR   net1. l          751
fd  =  socket (AF_INET ,  SOCK_STREAM ,  0) ;          753
serv_addr . sin_family = AF_INET ;          754
serv_addr . sin_addr. s_addr = htonl (SERV_ HOST_ADDR) ;          755
serv_addr . sin_port = htons (SERV_TCP_PORT) ;          756
connect (fd , (struct  sockaddr  *) &serv_ addr ,          758
        sizeof  (serv_addr) ) ;
send  and  receive  data  to  and  from  SERVER ;          759
close  (fd) ;          760
exit  (0) ;          761
```

FIG. 8



LAN : Local Area Network
WAN : Wide Area Network
SW : Switch
PBX : Private Branch Exchange